Optimism Predicts Resilience in Repatriated Prisoners of War: A 37-Year Longitudinal Study

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Resilience, exhibiting intact psychological functioning despite exposure to trauma, is one perspective as to why some people who are exposed to trauma do not develop symptoms. This study examines the prisoner of war experience to expand our understanding of this phenomenon in extreme cases of trauma such as prolonged captivity, malnourishment, and physical and psychological torture. The study examined the United States' longest detained American prisoners of war, those held in Vietnam in the 1960s through early 1970s. A logistic regression analysis using resilience, defined as never receiving any psychiatric diagnosis over a 37-year follow-up period, as the outcome was performed ($n = 224$ with complete data). Six variables showing at least small effects emerged: officer/enlisted status, age at time of capture, length of solitary confinement, low antisocial/psychopathic personality traits, low posttraumatic stress symptoms following repatriation, and optimism. Odds ratios (ORs) and confidence intervals (CIs) confirmed the significance and relative strength of these variables, with a range from $OR = 0.54$, 95% CI [0.13, 2.29] to $OR = 1.11$, 95% CI [1.04, 1.17]. When all variables were examined continuously and categorically, dispositional optimism was the strongest variable, accounting for 17%, continuously, and 14%, categorically. We discuss optimism as a protective factor for confronting trauma and the possibility of training to increase it.

There is considerable concern about the incidence of war-related posttraumatic stress disorder (PTSD) in military personnel following combat (Smith et al., 2008). Though a considerable amount of research has documented the impact of and treatment for PTSD after combat (e.g., Monson, Fredman, & Adair, 2008), there remains the question of understanding what factors explain why some who are exposed do not develop symptoms. Although 50%–60% of the U.S. population has experienced a traumatic event, only 5%–10% were later diagnosed with PTSD (Bonanno, 2004). In a study of 3,006 victims of physical assault, only 17.8% were identified as having PTSD (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993).

Even among children confronted with the most egregious type of abuse (repeated, ongoing, and severe physical and/or sexual abuse), not all go on to experience mental health problems later in life (Collishaw et al., 2007).

Research with those in the military has produced similar findings. The National Vietnam Veterans Readjustment Study (Kulka et al., 1990) estimated that 31% of male and 27% of female Vietnam veterans had PTSD at some point after combat. Rates of PTSD stemming from the Gulf war range from 9% to 18% (Toomey et al., 2007). Although the full impact of the conflicts in Iraq and Afghanistan are still underway, studies conducted soon after postdeployment estimate a lower rate of PTSD (i.e., 12%; Hoge et al., 2004). These studies also suggest that the majority of individuals exposed to trauma do not develop PTSD after their exposure.

There are different ideas about why some people exposed to trauma do not develop psychiatric symptoms. Resilience, exhibiting intact psychological functioning despite exposure to trauma (Bonanno, 2004; Smith, Tooley, Christopher, & Kay, 2010) is one perspective that has been offered. The literature indicates two conceptualizations of resilience: resilience as process and resilience as outcome. Reivich and Shatte (2002), for instance, define resilience as a set of abilities (i.e., emotion regulation, empathy, causal analysis, self-efficacy). Other researchers define resilience as an outcome and conceptualize resilience as an individual's ability to maintain stable psychological and physical functioning when exposed to an isolated

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14. ABSTRACT
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traumatic event such as the death of a loved one or a life-threatening situation (Bonanno, 2004).

Although to date there is no agreed upon conceptual framework or definition of resilience, in this study we choose to conceptualize resilience as an outcome. We did so because we were interested in identifying the variables related to resilience that allow individuals at high levels of risk for trauma exposure (i.e., military, police, firefighter personnel) to effectively complete their missions, returning to baseline functioning without developing a psychiatric illness. We used a working definition of resilience which entails that the traumatic event an individual is exposed to must involve a sufficient risk to which an individual shows resilience and must be demonstrated across a broad spectrum of outcomes and long time span (Collishaw et al., 2007). Our study was guided by the general hypothesis that demographic, psychological, and physical factors contribute to resilience (Feder, Nestler, & Charney, 2009; Tedeschi, Park, & Calhoun, 1998). Meta-analytic studies (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003) consistently reveal several factors which buffer stress (Tedeschi et al., 1998) including demographic factors such as gender and social status, genetic and/or biological (Lukey & Tepe, 2008) characteristics, and psychological factors including intelligence and personality.

One personality measure of interest is optimism. Research with civilian populations indicates optimists not only display superior adaptation to stressors, but also that optimism is protective such that individuals are less likely to develop medical illnesses (Rasmussen, Schier, & Greenhouse, 2009). Regarding military populations, studies with U.S. Army troops fighting in combat units in Iraq, found soldiers with a positive outlook were less likely to suffer health problems such as anxiety and depression (Michigan State University, 2011). There is limited research, however, examining the impact of optimism on resilience when the trauma involves extreme stress such as being a prisoner of war.

Because there is a limited amount of resilience research examining extreme exposure, we chose to study resilience and optimism in the case of trauma that occurred to Vietnam repatriated prisoners of war (RPW) who experienced prolonged captivity, malnourishment, and physical and psychological torture. Given prior studies, we propose that there are demographic, personality, and physical factors that function as a means for coping with extreme stress. We further explore whether optimism is predictive of resilience. In this study we use a guiding definition of optimism (Seligman, 2002) described as an explanatory style pertaining to how one explains life events. Optimists view bad events as temporary, local, and external; pessimists view bad events as permanent, pervasive, and personal ("it's going to last forever," "it's all my fault," "it's going to ruin me"). Doing so, additionally, allows us to align our definition with the guiding definition utilized by the U.S. Army in their resilience program based on optimism for coping with emotional distress (Casey, 2011).

Method

Participants and Procedure

The Robert E. Mitchell Center for Prisoner of War Studies holds the only longitudinal data set of the long-term effects of the RPW experience. Repatriates from all services and all recent U.S. conflicts (Vietnam, Gulf war, Somalia, Bosnia, and Iraq) are in this program. To ensure uniformity in measurement technique, war-specific stressors, and to avoid uneven sample sizes, only the data from Vietnam era participants, the largest and longest held group, were included in this retrospective analysis.

There were 662 military service personnel who survived captivity during the Vietnam war and were repatriated. Of these, 568 men were repatriated in the spring of 1973 as part of Operation Homecoming and 94 were repatriated earlier (1962–1972) after escaping or accepting early release. Since 1973, these repatriates have been eligible for annual voluntary medical and psychological follow-up within programs provided by the Department of Defense; most have participated. As of July 2011, there had been 121 deaths. Recent medical/psychiatric outcome data were available on 440 of the living repatriates, and this group formed our sample.

When the Vietnam-era repatriates were returned in 1973 they were examined using a 29 section, 477-page Initial Medical Evaluation Form. The form included instructions for conducting a number of medical and psychological examinations, and method of documentation. These examinations, and also debriefings, were conducted over several weeks by a team of physicians and mental health specialists. Most of the repatriates have been routinely medically and psychiatrically evaluated since 1973 to date. Subsequent psychiatric reevaluations have been conducted by a psychiatrist or clinical psychologist, and included record review, clinical interview, symptom monitoring, and mental status examination. Those *Diagnostic and Statistical Manual of Mental Disorders (DSM)* criteria available at the time of evaluation were utilized: *DSM Second Edition (DSM-II,* seventh printing; American Psychiatric Association (APA), 1974); *DSM Third Edition (DSM-III*; APA, 1980); *DSM Third Edition Revised (DSM-III-R*; APA, 1987); *DSM Fourth Edition (DSM-IV*; APA, 1994); *DSM Fourth Edition-Text Revised (DSM-IV-TR*; APA, 2000). Measures available for study were collected at different periods; there were substantial gaps in the data set. The final analysis was performed using only RPWs with complete data for all predictors and outcome variables. This reduced the sample to 224, about half of those in the data set.

Chi-square analyses indicated no statistically significant differences between those with and without complete data with the exception of service branch (Air Force personnel totaled 61% of the sample), officer/enlisted status (officers totaled 91% of the sample), and optimism (see below)—41% of the group were high, 30% were in the middle of the scale, and 29% were low.

Measures

Demographic and physical factors (obtained in 1973). The initial evaluation provided age at time of capture, officer/enlisted status, amount of time on active duty at the time of capture, education, marital status, captivity duration, captivity location, physical and psychological torture, and solitary confinement data. Solitary confinement was defined as a prisoner alone in a cell with minimal environmental stimulation, and no meaningful social interaction. It was measured in weeks: short ($M = 2$ weeks, range 0–5); medium ($M = 13$ weeks, range 6–25) or long ($M = 81$ weeks, 26–390). Physical variables extracted from the medical database included body mass index, pulse, systolic/diastolic blood pressure, white blood count (including differential and absolute counts), sedimentation rate, phosphorous, uric acid, albumin levels, fasting blood sugar, triglycerides, and total cholesterol.

Posttraumatic stress (obtained in 1973). A posttraumatic stress scale consisted of 13 items assessing the three major symptom clusters of PTSD as defined in *DSM-IV*—reexperiencing, numbing/avoidance, and hyperarousal and was done by King et al. (2011). Blind to outcome status, they extracted items from the 1973 interview form based on content judged as representing PTSD. The scale included one reexperiencing, six numbing/avoidance, and six hyperarousal items. In the current sample, $\alpha = .80$.

Minnesota Multiphasic Personality Inventory (obtained, on average, in 1975). Scale 4, Psychopathic Deviate (Pd) of the Minnesota Multiphasic Personality Inventory (MMPI) utilized and taps features such as authority conflicts, impulsivity, and interpersonal insensitivity. The set of MMPI scales was also used to generate a measure of optimism–pessimism. It was based on item-level work done to produce an MMPI Optimism-Pessimism explanatory style scale (Colligan, Offord, Malinchoc, Shulman, & Seligman, 1994). Because we did not have access to item-level data, we employed a regression equation developed by Malinchoc, Offord, and Colligan (1998) to derive our variable. Unfortunately, this could only be derived for the 224 subjects with scale data.

Resilience (obtained in 2010). To be defined as resilient, a participant must have never received any psychiatric diagnosis over the 37-year follow-up period. Of the 440, 188 had received at least one diagnosis: 112 had PTSD only, 32 had another single diagnosis (i.e., 8 dysthymia, 17 depression, 4 anxiety or generalized anxiety disorder, and 3 schizophrenia), 29 had comorbid diagnoses, 12 had only an alcohol use disorder, and 3 were defined as not resilient on the basis of a probable preexisting diagnosis that went undetected prior to captivity (attention deficit hyperactivity disorder, specific and social phobia). No diagnosis of PTSD was made prior to 1980, the year the *DSM-III* was published. Among those with no missing data there were 131 resilient and 93 nonresilient RPWs.

Data Analysis

Descriptive comparisons were conducted first, and then one analysis of variance to determine if the two resilience groups differed was conducted for each of the 109 available demographic, biological, and psychological variables. Approximately 69% of these variables were found to be nonsignificant or had a Cohen's $d < .20$, (Cohen, 1988). This left 29 variables with small effect sizes ($d \geq .20$) and five variables with medium effect sizes ($d \geq .50$) that were significant. Further analyses were performed with the 34 variables, using odds ratios comparing tertiles to the resilience grouping and yielded 17 which were statistically significant. Those 17 variables were then grouped into their respective category (i.e., demographic, physical, and psychological) and a logistic regression performed within each category. There was an overall logistic regression analysis conducted as well. In both the continuous and categorical analyses, the sample size varied considerably due to missing data for each variable.

Results

Descriptive statistics indicated nearly all demographic variables demonstrated either (a) no group differences, (b) restriction in range, and/or (c) high correlations with one another. The exceptions were officer/enlisted status, age at time of capture, and solitary confinement.

Six nonredundant and statistically significant variables survived the culling process (Table 1). There were three demographic variables added to the model that were not redundant (Tabachnick & Fidell, 2007)—officer/enlisted status, age at time of capture, and solitary confinement—and three psychological variables—PTSD symptoms, the MMPI Pd score and optimism. To address the issue that possible pathology within the first 2 years influenced psychiatric outcome, a logistic regression examining optimism and pathology (defined as number of elevated clinical scales on the MMPI) as the predictor variables with psychiatric illness as the outcome variable was conducted. Results indicated optimism, $B = -0.16$, $SE\ B = 0.04$, Wald $\chi^2(1) = 18.45$, $p < .001$, but not number of elevated clinical MMPI subscales, $B = -0.003$, $SE\ B = 0.20$, Wald $\chi^2(1) = .03$, $p < .87$, significantly predict resilience. Finally, the model development procedures yielded no statistically significant objective physical variables.

We examined these six variables individually in their continuous and categorical forms. For the categorical analysis (Table 2), the range for optimism was reversed because it was derived from the MMPI: low was 42.52–77.01, middle was 40.64–45.46, and high was 32.19–40.50. The ranges for Pd were raw scores: low = 1–13, middle = 14–16, and high = 17–37. Age was categorized into 19–26, 27–32, and 33–45, confinement was dichotomous— <26 weeks versus 26–390 weeks. PTSD symptoms were none, 1–2, and ≥ 3.

All predictors were significant in the continuous analyses (not tabled), with Nagelkerke's R^2 ranging from .17 for optimism to .01 for duration of solitary confinement. Optimism was the

Table 1
Means and Standard Deviations by Group, and Effect Size Differences

	Resilient			Nonresilient			
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*	*d*
MMPI Optimism	166	41.8	6.1	131	48.0	10.5	0.70***
MMPI Pd	166	14.6	3.4	131	17.1	4.8	0.60***
Age at time of capture	250	30.5	5.5	171	27.9	5.5	0.40***
PTSD symptoms	230	1.6	2.1	150	2.5	3.6	0.30**
Weeks of solitary confinement	253	29.4	43.0	187	38.5	58.0	0.20
Officer/enlisted status							
Enlisted	15	23%		51	76%		
Officer	235	64%		135	36%		1.04***

Note. MMPI = Minnesota Multiphasic Personality Inventory; Pd = psychopathic deviate; PTSD = posttraumatic stress disorder.

**$p < .01$. ***$p < .001$.

strongest predictor in the categorical approach (Table 2). The most optimistic were 5 times more likely to be resilient than the least optimistic; similarly, officers were 5 times more likely to be resilient than enlisted individuals, which was the next strongest predictor.

Table 2
Logistic Regression Analyses Predicting Resilience

Variable	*n*	R^2	OR	95% CI
Officer/enlisted status	440	.11*		
Officer			5.60	[3.11, 10.06]
Enlisted			1.00	–
MMPI Optimism	302	.14*		
High			5.10	[2.82, 9.23]
Middle			3.33	[1.84, 6.03]
Low			1.00	–
MMPI Pd	332	.07*		
Low			3.42	[1.92, 6.08]
Medium			1.68	[1.00, 2.81]
High			1.00	–
Age at time of capture	423	.06*		
Oldest			2.91	[1.81, 4.89]
Middle			1.72	[1.08, 2.75]
Youngest			1.00	–
Solitary confinement (weeks)	440	.02*		
Short/Medium			1.76	[1.19, 2.61]
Long			1.00	–
PTSD symptoms	385	.03*		
None			1.75	[1.04, 2.92]
1–2			0.92	[0.54, 1.54]
3 +			1.00	–

Note. OR = Odds ratio; CI = confidence interval; MMPI = Minnesota Multiphasic Personality Inventory; Pd = psychopathic deviate; PTSD = posttraumatic stress disorder. Nagelkerke's R^2 is tabled.

*$p < .05$.

The logistic regression predicting resilience from the six predictors entered simultaneously employed only the 131 resilient and 93 nonresilient with complete data. The test of the logistic regression model using all six predictors against a constant-only was statistically significant, $\chi^2(6) = 48.56, p < .001$, indicating the predictors distinguished between resilient and nonresilient repatriates. The results of the goodness-of-fit test (Hosmer & Lemeshow, 2000) demonstrated the observed data was reasonably approximated by the model, $\chi^2(8) = 5.65, p = .69$. The variance in resilience accounted for by the model was moderate with Nagelkerke's $R^2 = .26$. Nevertheless, classification accuracy was impressive in view of the length of time since repatriation and the broad definition of resilience, with 87% of the resilient repatriates correctly predicted, for an overall success rate of 70%.

The odds ratio of each of these variables (Table 3) demonstrates there was limited change in the likelihood of long-term resilience on the basis of a 1-unit change in the optimism–pessimism MMPI score, or a 1-year change in age. Specifically, a 1-unit reduction in the optimism–pessimism measure increased the likelihood of resilience by 5.3% and a 1 year increase in age increased the likelihood of resilience by 10.5%. If a 10-point difference in the optimism–pessimism score was taken as clinically significant, holding other variables constant, there was a 42% increase in the likelihood of resilience with a 10-point decline in the optimism–pessimism score. In this sample, the median effective loading statistic, EL_{50} (Bewick, Cheek, & Ball, 2005), revealed the likelihood of resilience was greater among repatriates older than 25 and repatriates whose MMPI optimism–pessimism MMPI score was less than 47.

After accounting for the shared variance among the predictors, in this model the Wald criterion suggested only the optimism–pessimism score, $\chi^2(1) = 4.76, p = .03$, and age at time of capture, $\chi^2(1) = 10.55, p = .001$ reliably predicted resilience (Table 3). Although the 6-variable model indicated optimism and age were the two strongest predictors of resilience, the other four variables (officer/enlisted, solitary confinement

Table 3

Simultaneous Logistic Regression Analysis Predicting Resilience

Variable	B	SE	OR	95% CI	Wald χ^2
Age at time of capture	0.10	0.03	1.11	[1.04, 1.17]	10.55***
Weeks of solitary confinement	0.01	0.00	0.99	[0.99, 1.00]	3.31
PTSD symptoms	0.11	0.07	0.90	[0.78, 1.04]	2.05
MMPI Pd	0.07	0.05	0.93	[0.85, 1.03]	1.95
MMPI Optimism	0.05	0.03	0.95	[0.90, 1.00]	4.76*
Officer/enlisted status	0.61	0.73	0.54	[0.13, 2.29]	0.69

Note. $n = 224$. OR = Odds ratio; CI = confidence interval; PTSD = posttraumatic stress disorder; MMPI = Minnesota Multiphasic Personality Inventory; Pd = psychopathic deviate.

*$p < .05$. ***$p < .001$.

duration, PTSD symptoms, and Pd) were still relevant because they were significant in a 4-variable model which was reliably different from a constant-only model, $\chi^2(4) = 32.67, p < .001$, the full 6-variable model, $\chi^2(2) = 15.89, p < .001$, and a minimal model using only officer/enlisted status and Pd, $\chi^2(2) = 6.36, p < .04$.

We also tested the interaction between optimism and solitary confinement. Regardless of solitary confinement length (short, 2 weeks; medium, 13 weeks; or long, 81 weeks) there was no interaction between solitary confinement and optimism ($r = .005, p = .936$).

Discussion

Lessons learned from Vietnam RPWs, men who flourished despite extreme trauma, may be critical for understanding factors contributing to resilience and may well be applicable to civilian as well as military populations. The results indicate that among this group, it was not merely the type of trauma that occurred which explained how one fared afterwards, but in addition, what type of person who experienced the trauma. The variable that had the strongest association with resilience was an explanatory personality style, optimism–pessimism. In fact, optimism was a stronger predictor of resilience than experience type assessed through torture variables like solitary confinement. That optimism is operative may not have been unexpected, but our findings show that this is the case even in the most horrific of circumstances.

Of the six variables associated with resilience, optimism, the variable accounting for the most variance explained, is the only variable that could be altered through training or intervention. This is especially important and relevant for those with a high likelihood of trauma exposure. Optimism is driven by patterns of thought, and such patterns can be learned. This is the approach when using cognitive behavioral techniques to assist individuals to reshape their way of interpreting events (Seligman, 2002). Helping pessimists become optimists entails changing their way of thinking involving a variety of domains: (a) personalization (thoughts are changed from "it's all my fault" to less personalized ones), (b) permanence (thoughts are changed from "it's going to last forever" to "it's temporary"), and (c) pervasiveness (thoughts are changed from "it's going to ruin my entire life" to "this event is specific to this area of my life"). Replacing the former thoughts may allow an individual to better cope and use strategies effective for coping with emotional distress.

An additional key finding is that optimism was a stronger predictor than solitary confinement, the torture variable most uniquely associated with resilience, nor was there an interaction between optimism and confinement. Rather, results indicate it was not the severity or duration of confinement that determined an individual's resilience, but the level of optimism, with higher scores being associated with resilience. The dosage effect, the idea that type, duration, and intensity of exposure influence healthy adjustment (Bonanno & Mancini, 2008) is not fully supported in this study.

To our knowledge, this is the first study of its kind to examine solitary confinement and resilience. Variation in response to solitary confinement shows individuals with more stable personalities and individuals with stronger cognitive functioning are less severely affected (Grassian, 1983). Harm caused by solitary confinement usually results in severe exacerbation, recurrence of a preexisting mental condition (Grassian, 1983), or the appearance of a mental illness in those previously free of them (Shalev, 2008). The stringent screening and training this cohort of veterans (mostly military aviation personnel) underwent may help explain why solitary confinement, although a significant predictor in the final model, was not the most significant variable, but this is speculative and not tested in our data. Our findings, however, suggest the importance of continued study of military preparation for the likelihood of solitary confinement in training programs for military personnel who will be on the front lines of battle to the degree that researching this issue is feasible.

Presence of PTSD symptoms upon repatriation had a small, but significant association; for individuals with the presence of these symptoms early on, such indicators may resemble subthreshold psychopathology. Consistent with research in this area, an estimated 5%–10% of individuals exposed to a

traumatic event will display delayed PTSD (Buckley, Blanchard, & Hickling, 1996). The question, however, of whether partial PTSD in 1973 led to full PTSD later on due to exacerbation or delay is not clear. These findings highlight the importance of early PTSD screening, as the passage of time does not always mend wounds; instead, if an individual goes without help, symptoms can worsen.

We also found that lower scores on the MMPI Pd scale, officer status, and older age at time of capture significantly predicted resilience. These findings are consistent with past studies finding elevations in MMPI subscales comparing Vietnam veteran to civilian samples (Wilson & Walker, 1990) and comparing male Vietnam combat and noncombat veterans (Berk, Black, Keane, & Penk, 1989). Our findings suggest that variation on certain MMPI subscales following traumatizing life events may be a useful screen for potential psychiatric issues. More specifically, the MMPI Pd score results indicate screening for individuals with antisocial personality features such as authority conflicts, impulsivity, and interpersonal insensitivity may be useful during the recruitment process.

The protective effects of age and officer status are consistent with previous research (Sutker, Davis, Uddo, & Ditta, 1995). In our cohort, older age served as a protective factor likely because of its relationship with length of service in the military, which would bring with it experience as a military aviator. Officer/Enlisted status is to a large extent a proxy for education (Sutker et al., 1995).

This study has a number of limitations. First, many of the findings are based on only half the sample. Second, many of the measures in our study were based on self-reports, which bring with it a number of limitations such as concerns about social desirability. Third, because we have no precaptivity assessments of posttraumatic stress symptoms, Pd scores, or optimism, we were unable to assess changes posttrauma. It is unclear whether and to what degree there were changes in any of these variables. Fourth, no objective physical markers available in the database such as blood pressure, white blood count, or body mass index (a measure of malnourishment), for example, proved to be predictors of resilience. This result should be interpreted with caution. It might in part be explained by the fact that by the time the RPWs were released from North Vietnam they had been treated more humanely and were given better nutrition. Fifth, due to variable redundancy, missing data, and restriction of range we could not fully explore certain variables such as marital status.

Additionally, this study could not address the causal linkage between war experiences and subsequent mental health problems. Although Vietnam RPWs endured extreme forms of war trauma, given the length of the study, it is possible that some RPWs developed psychiatric disorders as a result of other life stressors not related to their prisoner-of-war experience such as personal losses or difficulties with employment, etc. Without controlling for life stressors to ensure equivalence postcaptivity between resilient and nonresilient RPWs, the possibility other variables contributed to psychiatric problems cannot be ruled out. Also, the mere presence or absence of psychiatric illness is in itself an inelegant definition of resilience. Other measures often associated with reactions to trauma such as hardiness, psychological well-being, and posttraumatic growth may demonstrate the limitations of our retrospectively based definition of resilience. Finally, because this study examined a Vietnam era veteran, male only, predominately aviation personnel, European American, and officer cohort, results may not generalize to populations outside this group.

Resiliency involves an array of factors. Variables evaluated in this study are not the only potential predictors of resiliency. In this study, optimism is the strongest predictor of resilience; however, it is neither the sole nor only predictor. Creating comprehensive models of resilience which examine the different types of physical, psychological, and demographic variables that contribute to effectively coping with trauma should be the continued goal within this field. Only in creating the most comprehensive view of resilience can prevention and intervention programs be best designed.

The science behind the benefits of optimism and the training of it are already being utilized by the US Army. The current study highlights the importance of optimism training for our military service members. It confirms the significance of the Army's current Comprehensive Solider Fitness Training, the resilience program based on optimism for coping with emotional distress (Casey, 2011).

The Vietnam RPWs were the longest held group of Americans to ever be taken as combat prisoners. They are an extraordinary example of the power of the human being to survive and even thrive despite extreme trauma. The lessons learned from these heroes can be used to better train and screen military service members of this generation.

References

American Psychiatric Association. (1974). Diagnostic and statistical manual of mental disorders (2nd ed., seventh printing.). Washington, DC: Author. (Originally published 1968).

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, DC: Author.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd ed., rev.). Washington, DC: Author.

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th ed., text revised). Washington, DC: Author.

Berk, E., Black, J., Keane, T., & Penk, W. (1989). Traumatogenicity: Effects of self-reported noncombat trauma on MMPIs of male Vietnam combat and noncombat veterans treated for substance abuse. *Journal of Clinical Psychology*, *45*, 704–708. doi:10.1002/1097-4679(198909)45:5<704::AID-JCLP2270450504>3.0.CO;2-6

Bewick, V., Cheek, L., & Ball, J. (2005). Statistics review 14: Logistic regression. *Critical Care*, *9*, 112–118. doi:10.1186/cc3045

Bonanno, G. (2004). Loss, trauma and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, *59*, 20–28. doi:10.1037/0003-066x.59.1.20

Bonanno, G., & Mancini, A. (2008). The human capacity to thrive in the face of potential trauma. *Pediatrics*, *121*, 369–375. doi:10.1542/peds.2007-1648

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal*

of Consulting and Clinical Psychology, *68*, 748–766. doi:10.1037/0022-006x.68.5.748

Buckley, T. C., Blanchard, E. B., & Hickling, E. J. (1996). A prospective examination of delayed onset PTSD secondary to motor vehicle accidents. *Journal of Abnormal Psychology*, *105*, 617–625. doi:10.1037/0021-843X.105.4.617

Casey, G. (2011). Comprehensive soldier fitness: A vision for psychological resilience in the U.S. Army. *American Psychologist*, *66*, 1–3. doi:10.1037/a0021930

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Colligan, R., Offord, K., Malinchoc, M., Shulman, P., & Seligman, M. E. P. (1994). CAVEing the MMPI for an Optimism–Pessimism Scale: Seligman's attributional model and the assessment of explanatory style. *Journal of Clinical Psychology*, *50*, 71–95. doi: 10.1002/1097-4679(199401)50:1<71::AID-JCLP2270500107>3.0.CO;2-8

Collishaw, S., Pickles, A., Messer, J., Rutter, M., Shearer, C., & Maughan, B. (2007). Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample. *Child Abuse and Neglect*, *31*, 211–229. doi: 10.1016/j.chiabu.2007.02.004

Feder, A., Nestler, E., & Charney, D. (2009). Psychobiology and molecular genetics of resilience. *Nature*, *10*, 446–456. doi:10.1038/nrn2649

Grassian, S. (1983). Psychopathological effects of solitary confinement. *American Journal of Psychiatry*, *140(11)*, 1450–1954.

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine*, *351*, 13–22. doi:10.1056/NEJMoa040603

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York: Wiley.

King, L. A., King, D. W., Schuster, J., Park, C. L., Moore, J. L., Kaloupek, D. G., & Keane, T. M. (2011). Captivity stressors and mental health consequences among repatriated U.S. Navy, Army, and Marine Vietnam-era prisoners of war. *Psychological Trauma: Theory, Research Practice and Policy*, *3*, 412–420. doi:10.1037/a0021411

Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R., & Weiss, D. S. (1990). *Trauma and the Vietnam war generation: Report of findings from the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel.

Lukey, B., & Tepe, V. (2008). *Biobehavioral resilience to stress*. New York: CRC Press.

Malinchoc, M., Offord, K., & Colligan, R. (1998). Pessimism in the profile: Estimating explanatory style from the MMPI. *Journal of Clinical Psychology*, *54*, 169–173. doi:10.1002/(SICI)1097-4679(199802)54:2<169::AID-JCLP6>3.0.CO;2-N

Michigan State University. (2011, January 5). Resiliency on the battlefield: Soldiers with a positive outlook less likely to suffer anxiety, depres-

sion. *Science Daily*. Retrieved from http://www.sciencedaily.com/releases/2011/01/110104101340.htm

Monson, C. M., Fredman, S. J., & Adair, K. C. (2008). Cognitive–behavioral conjoint therapy for posttraumatic stress disorder: Application to Operation Enduring and Iraqi Freedom veterans. *Journal of Clinical Psychology: In Session*, *64*, 958–971. doi:10.1002/jclp.20511

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin*, *129*, 52–73. doi:10.1037//0033-2909.129.1.52

Rasmussen, H., Schier, M., & Greenhouse, J. (2009). Optimism and physical health: A meta-analytic review. *Annals of Behavioral Medicine*, *37*, 239–256. doi:10.1007/s12160-009-9111-x

Reivich, K., & Shatte, A. (2002). The resilience factor: 7 Keys to finding your inner strength and overcoming life's hurdles. New York: Broadway Books.

Resnick, H., Kilpatrick, D., Dansky, B., Saunders, B., & Best, C. (1993). Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology*, *61*, 984–991. doi:10.1037/0022-006X.61.6.984

Seligman, M. E. P. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. New York: Free Press/Simon and Schuster.

Shalev, S. (2008). *A sourcebook on solitary confinement*. Retrieved from www.solitaryconfinement.org

Smith, B. W., Tooley, E. M., Christopher, P. J., & Kay, V. S. (2010). Resilience as the ability to bounce back from stress: A neglected personal resource? *The Journal of Positive Psychology*, *5*, 166–176. doi:10.1080/17439760.2010.482186

Smith, T. C., Ryan, M., Wingard, D. L., Slymen, D. J., Sallis J. F., & Kritz-Silverstein, D. L. (2008). New onset and persistent symptoms of posttraumatic stress disorder reported after deployment and combat exposure: Prospective population based US military cohort study. *British Medical Journal*, *336*, 366–371. doi:10.1136/bmj.39430.638241.AE

Sutker, P. B., Davis, J. M., Uddo, M., & Ditta, S. R. (1995). War zone stress, personal resources, and PTSD in Persian Gulf War returnees. *Journal of Abnormal Psychology*, *104*, 444–452. doi:10.1037/0021-843X.104.3.444

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson.

Tedeschi, R., Park, C., & Calhoun, L. (1998). *Posttraumatic growth: Positive changes in the aftermath of crisis*. Hillsdale, NJ: Erlbaum.

Toomey, R., Kang, H., Karlinsky, J., Baker, D. G., Vasterling, J. J., Alpem, R., Eisen, S. A. (2007). Mental health of US Gulf war veterans 10 years after the war. *The British Journal of Psychiatry*, *190*, 385–393. doi:10.1192/bjp.bp.105.019539

Wilson, J. P., & Walker, A. (1990). Toward an MMPI trauma profile. *Journal of Traumatic Stress*, *3*, 151–168. doi:10.1002/jts.2490030111